# Curriculum Vitae

## Susan Kurien

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**Date of Birth:** June 12, 1972
**Place of Birth:** Kerala, India
**Nationality:** Indian

## Employment

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| May 2004 – present: | Staff Member, Mathematical Modeling and Analysis group (T-7), Los Alamos National Laboratory. |
| Jan 2002 – May 2004 : | Postdoctoral Research Associate, Center for Nonlinear Studies (CNLS) and the Mathematical Modeling and Analysis group (T-7), Los Alamos National Laboratory. |
| Sept - Nov 2001: | Postdoctoral Associate, Mason Laboratory, Yale University. |

## Education

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| 1995-2001: | Yale University, New Haven, Connecticut<br>M. S., M. Phil., Physics, May 1998.<br>Ph.D., Physics, December 2001. Thesis title*: Anisotropy and the Universal Properties of Turbulence.* Thesis supervisor: Prof. Katepalli R. Sreenivasan (now Director of the Abdus Salam International Center for Theoretical Physics, Trieste, Italy). |
| 1991-1995: | University of Pennsylvania, Philadelphia, Pennsylvania.<br>B.S. *cum laude,* Computer Science and Engineering, dual major in Physics, minor in Mathematics. Benjamin Franklin Scholar (Honors). |

## Research interests

Statistical hydrodynamics and turbulence -- theory, computation, data analysis, modeling and experiments.

## Peer reviewed publications

- Anomalous scaling of low-order velocity statistics in turbulence, S. Chen, B. Dhruva, S. Kurien, K. R. Sreenivasan and M.A. Taylor, Accepted to *Journal of Fluid Mechanics* (2005).
- Isotropic third-order statistics in turbulence with helicity: the 2/15-law, S. Kurien, M.A. Taylor and T. Matsumoto, *Journal of Fluid Mechanics*, vol. 515, 87 (2004).
- Sign-symmetry of temperature structure functions, K.G. Aivalis, S. Kurien, J. Schumacher and K.R. Sreenivasan, *Physical Review E,* vol. 69, 066315 (2004).
- Cascade time-scales of energy and helicity in homogeneous, isotropic turbulence, S. Kurien, M.A. Taylor, T. Matsumoto, *Physical Review E,* vol. 69, 066313 (2004).
- Recovering isotropic statistics in turbulence simulations: The Kolmogorov 4/5th- Law, M.A. Taylor, S. Kurien and G. L. Eyink, *Physical Review E,* vol. 68, 026310 (2003).
- Reflection antisymmetric counterpart of the Karman-Howarth dynamical equation, S. Kurien, *Physica D: Nonlinear Phenomena*, vol. 175/3-4, 167 (2003).
- Anisotropy of small-scale scalar turbulence, S. Kurien, K.G. Aivalis and K.R. Sreenivasan, *Journal of Fluid Mechanics*, vol. 448, 279 ( 2001).
- Dynamical equations for high-order structure functions, and a comparison of a mean field theory with experiments in three-dimensional turbulence*,* S. Kurien and K.R. Sreenivasan*, Physical Review E,* vol. 64, 6302, (2001).
- Anisotropic scaling contributions to high-order structure functions in high-Reynolds-number turbulence, S. Kurien and K.R. Sreenivasan, *Physical Review E,* vol. 62, 2206 (2000).
- Scaling structure of the velocity statistics in atmospheric boundary layers, S. Kurien, V.S. L'vov, I. Procaccia and K.R. Sreenivasan, *Physical Review E*, vol. 61, 407 (2000).
- Extraction of anisotropic contributions in turbulent flows, I. Arad, B. Dhruva, S. Kurien, V.S. L'vov, I. Procaccia and K.R. Sreenivasan, *Physical Review Letters*, vol. 81, 5330 (1998).

126 citations as of September 8, 2004 (Source: SciSearch citation index)

## Papers submitted or in preparation

- Potential vorticity energy as a diagnostic in rotating and stratified flows, S. Kurien, L. Smith and B. Wingate. In preparation (2005).

## Other publications

- The LANS-alpha model for computing turbulence: Origins, Results and Open Problems, D. D. Holm, D. Livescu, C. Jeffery, S. Kurien, M. A. Taylor and B. A. Wingate, *Los Alamos Science*, No. 29, 152 – 171 (2005).
- Direct Numerical Simulation of Turbulence: Data Generation and Statistical Analysis, S. Kurien and M. A. Taylor, *Los Alamos Science*, No. 29, 142 – 151 (2005).
- Measures of anisotropy and the universal properties of turbulence, S. Kurien and K.R. Sreenivasan, In "New Trends in Turbulence" , *Proceedings of the Les Houches Summer School 2000,* Ed.: M. Lesieur, *Springer and EDP-Sciences,* (2002).

## Talks

- “Cascade timescales for energy and helicity in isotropic homogeneous turbulence”, University of New Mexico, American Mathematical Society Sectional Meeting, October 2004.
- “Anomalous scaling of low-order turbulence velocity statistics”, Center for Nonlinear Studies Seminar, Los Alamos National Laboratory, July 2004.
- "Helicity and the Kolmogorov Phenomenology of Turbulence", Center for Nonlinear Studies Colloquium, April 2004.
- “"Helicity and the Kolmogorov Phenomenology of Turbulence", University of Illinois at Urbana-Champaign, Mechanical Engineering Colloquium, Invited speaker, April 2004.
- Symmetry breaking in turbulent velocity statistics – Rotation and Reflection”, University of Central Florida, Mathematics Special Colloquium, Invited speaker, February 2004 .
- “Symmetry breaking in turbulent velocity statistics – Rotation and Reflection”, Purdue University, Mathematics Seminar, Invited speaker, February 2004.
- “Helicity and the Kolmogorov Phenomenology of Turbulence”, Purdue University, Earth and Atmospheric Sciences Seminar, Invited speaker, February 2004.
- Parity-breaking statistics in homogeneous isotropic turbulence”, American Physical Society, 56th Annual Meeting of the Division of Fluid Dynamics, New Jersey, November 2003.
- "The Scaling Structure of Velocity Statistics in Turbulence". Workshop for "Subgrid scale turbulence modeling in geophysical flows" at the Institute for Pure and Applied Mathematics, UCLA, August 2003.
- "The Scaling Structure of Velocity Statistics at High Reynolds Numbers". Mini-symposium at the Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2003.
- " The Scaling Structure of Velocity Statistics at High-Reynolds Numbers". University of New Mexico, Department of Mathematics Navier-Stokes Seminar Series, Invited speaker, December 2002.
- "Karman-Howarth Dynamical Equation for Reflection-Symmetry Breaking in Turbulent Flows". The "Geometrical Mechanics and Turbulence Modeling Workshop" , Santa Fe, New Mexico, November 2002.
- "Recovering isotropic statistics in turbulence simulations". Center for Nonlinear Studies Postdoc Forum, Los Alamos, New Mexico, August 2002.
- "Equations for higher-order structure functions in turbulence: Experimental evaluation of a model for the pressure contributions". Center for Nonlinear Studies "Arizona Days", Los Alamos, New Mexico, February 2002.
- "Scaling properties of statistical hydrodynamics". Meeting for "Adaptive and High-Order Methods with Applications in Turbulence", National Center for Atmospheric Research, February 2002.
- "Anisotropy of small-scale scalar turbulence", American Physical Society, 54th Annual Meeting of the Division of Fluid Dynamics, San Diego, California, November 2001.
- "Anisotropy and the Universal Properties of Turbulence". Cornell University,

Mechanical and Aerospace Engineering Colloquium, Invited speaker, October 2001.

- "Anisotropic contributions to scaling in high-Reynolds-number turbulence". American Physical Society, 53rd Annual Meeting of the Division of Fluid Dynamics, Washington DC, November 2000.

## Teaching and mentoring

Summer /Fall 2003: Mentor to two PhD candidates who participated in the Summer Graduate Research Assistantship program. Advisory and collaborative role on projects and on the choice of research programs and thesis topics.

1995-2001: Teaching Assistant and tutor at Yale University. Undergraduate Physics Laboratory courses and recitation sections for Physics, Astronomy and Mathematics.

## Award

2003: Achievement Award for "Fundamental Breakthrough in Turbulence Theory and Data Analysis" (Monetary Awards: Los Alamos Awards Program). This award was for work done over the preceding year co-developing new diagnostics to analyze anisotropic turbulence data and the application of these diagnostics to reveal symmetry properties of the small-scales of helical flows.

## Other

Co-organizer for 13$^{th}$ Annual Arizona Days Conference (January 30-31, 2004, CNLS)
Referee for Physical Review Letters, Physical Review E, Journal of Fluid Mechanics, Proceedings of the Royal Society A, Journal of Turbulence.
Member of the American Physical Society.